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ABSTRACT

This paper focuses on the development and/or improvement of instruments that can be used to measure the competence of preservice teacher education students. A number of questions need to be considered before making decisions concerning the development and improvement of such instruments: (1) At what level of specificity are the competencies to be measured stated? (2) In what context (symbolic, simulated, or work) is the demonstration of the competency to be measured? (3) How often and at what points are preservice teachers to be measured? (4) Who is to be involved in measuring the performance of preservice teachers? (5) Will the measurement of competence be formative, summative, or both? (6) How much time will be required for measurement? and (7) What is to be measured? The instruments now available to measure teacher behavior fall into two categories: (1) instruments used by school systems to rate personnel and instruments developed by colleges and universities to measure performance in student teaching; and (2) instruments that have been constructed primarily for use in research. Four types of instruments suggested for measurement of preservice teacher competencies discussed are: systematic observation; rating scales, interviews, and teacher products. (MM)

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Developing and Improving Instruments for Measuring the Competence of Preservice Teacher Education Students

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Competency Assessment

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Developing and Improving Instruments for Measuring the Competence of Preservice Teacher Education Students

The measurement of competence is perhaps the most difficult task faced by developers and implementers of Competency Based Teacher Education (CBTE) programs. This paper attempts to focus on only one phase of the assessment problem, the development and/or improvement of instruments that can be used in the measurement of the competence of preservice teacher education students. The paper does not deal with the affective area of teacher competence. The paper does not deal with the problems of researching teacher effectiveness nor does it deal with the philosophical issues of the desirability of a data base before proceeding with the measurement of competence.

The term measurement can be defined as a procedure where numbers are uniquely assigned to entities: persons, other organisms, objects, statements, etc., (Cureton, 1969). The entity we are concerned about is the measurement of the performance of people and the assignment of some sort of value to that performance. Assessment and evaluation are broader terms. Measurement is often considered as a part of assessment and evaluation.

The term competence can be defined as being qualified, capable, or adequate. The term competency is defined by Johnson, Shearron, Hensel, (1974) as being a rational performance which satisfactorily meets the objectives for a desired condition. There are many parts of a competency. Performance is an observable behavior, but it includes the manipulation of ideas and the making of judgements and decisions. This paper deals only

with the measurement of the observable performance part of a competency.

Questions to be Considered

There are a number of questions that need to be considered before one makes decisions concerning the development and improvement of instruments for measuring the competence of preservice teacher education students. These questions are interrelated. Consideration of one without the consideration of the others will probably leave us with measurement devices that are not useful in the real world of a teacher education program.

1. At what level of specificity are the competencies that are to be measured stated? A major problem in measuring competence is the lack of operational definitions for the competencies to be measured. Instruments designed to measure competence should relate directly to the statements of competence. The more specific the competency statements, the easier the task of measurement. Failure to operationally define competencies leaves us with highly subjective measures that are no better than what has traditionally been used. Consider the following competency statement found on many lists of competencies. The teacher gives clear directions to pupils. What does this mean in terms of measurement? The situations in which this competency might be measured could differ significantly. For example, the preservice teacher could be giving directions for behavior in the classroom or the directions could be the assignment of a lesson in mathematics.

An operational definition is needed that defines specifically what kind and type directions are to be measured.

2. In what context is the demonstration of the competency to be measured? There are a number of contexts in which competencies can be measured. Turner (1974) identifies three which are found in many teacher education programs.

a. Symbolic Context. This refers to the college or university context. Typically, only verbal performance or what the preservice teacher knows as opposed to what he/she actually does.

b. Simulated Context. This is the laboratory context. Films, video tapes and other kinds of aids are employed. Teaching is restricted to such things as microteaching. The context is quasi-concrete, but verbal performance predominates.

c. Work Context. This is the "real" classroom setting where students have opportunities to integrate knowledge and action. Performance is what is measured in this context. Shearron and Johnson (1973) divide the work context into two parts. Part one is referred to as working with pupils in structured situations. This means that classroom situations are specifically designed for the student to practice and demonstrate specific teaching skills. For example, a social studies lesson is structured to be a question-answer situation to enable the student to demonstrate this particular skill. The second part of the work context is referred to as an unstructured situation. In an unstructured situation, preservice teachers are evaluated when they demonstrate competencies as the need for those

competencies occur. An illustration of this is that the preservice teacher would use skills in classroom management as they are needed.

The question of context is extremely important. It is much easier to develop or adapt instruments to measure competence in a structured work context than it is to develop instruments that are all inclusive to be used in an unstructured work context. Attempts to do the latter have at least in the past often ended up as checklists that cover everything in a highly subjective manner.

Measurement in a symbolic context is the easiest and the most familiar to most teacher educators. Paper and pencil tests and other ways of measuring knowledge do not necessarily require the development of instruments. The instruments developed for measurement in a work context can often be adapted to the simulated context.

3. How often and at what points are preservice teachers to be measured? A major problem in measuring performance by observation in the unstructured work context is controlling the sampling of individual behavior. McNeil and Popham (1973) point out that a major deterent to the use of rating scales is the failure to control for sampling teacher behavior. A strategy for sampling behavior must be developed along with the development of instrument designed to measure performance by observation.

4. Who is to be involved in measuring the performance of preservice teachers? In the preservice program there are several categories of individuals who could be involved in the

measurement process. The question of context is, of course, closely related to this question. Assuming that measurement of competence is to take place in the work context, we would have college and university personnel, classroom teachers, and peers, available to measure the competence of the preservice student. In the structured work context any of these three categories of persons could be employed. However, in the unstructured work context it would be extremely costly to involve anyone other than the classroom teacher who would be there anyway.

5. Will the measurement of competence be designed to be formative, summative, or both? This is an extremely important question to be resolved. As we shall see later in this paper, formative evaluation, which in the author's view is part of a training program, lends itself to using systematic observation instruments that focus on bits and pieces of a teaching competency. While summative evaluation should consider the total competency, there are some types of measuring devices which are more appropriate for one than the other.

6. How much time will be required for measurement? A very real problem is the amount of time required to measure competence. In adapting or developing any instruments for measurement consideration must be given to the amount of time involved in utilizing the instrument. In general, the instruments will need to allow for the collection of data at a reasonable rate.

7. What is to be measured? This final question is one that cannot be answered by saying, "we are measuring competence."

That is not an operational statement that can be translated into some type of action. The sub-questions that fall out of this more inclusive one are: Do you measure every student on every competence? Do you sample behavior in the unstructured work context? Do you limit measurement to the structured work context? These questions need to be dealt with prior to making decisions about the instruments needed to measure competence.

What Can We Use?

There are currently hundreds of instruments available to measure teacher behavior. Kay (1974) reports that these instruments fall roughly into two types, neither of which are wholly appropriate for measuring the performance of preservice teachers. The first type contains instruments used by school systems to rate personnel and instruments developed by colleges and universities to measure performance in student teaching. These instruments are very subjective because of the lack of operational definitions for the categories being measured by the instruments. The second type of available instruments contains those that have been constructed primarily for use in research. These instruments usually focus on some highly defined and very specific teacher behavior. These instruments can provide evidence that preservice teachers possess specified skills in isolation, but they do not measure the complexities of classroom situations.

The criticism made by many that the instruments to measure

performance are not available is to a great extent true. However, the American Association of Colleges for Teacher Education's Committee on Performance Based Teacher Education (1975) points out that the lack of instruments is clearly not unique to CBTE programs. The committee recommends that it is time to spend less time on talking about the lack of capability to measure teacher performance and to put our energies on increasing that capability.

The next section of the paper will focus on the types of instruments that can be used to measure competence. Attention will be given to four types of instruments.

Systematic Observation

Furst and Hill (1971) define systematic observation as a set of procedures which uses systems of categories to code and to quantify classroom behaviors of teachers and students. The procedures require that observed behaviors be coded or classified by nonevaluative relatively objective sets of categories which describe specific behaviors or actions. Most of the systematic observation instruments in use were originally designed for research purposes rather than for evaluating and measuring teacher performance. Simon and Boyer (1974) in Mirrors for Behavior III report on 99 observation systems. All except one have been used for research purposes. Only twelve instruments are reported to have been used for evaluative purposes.

Many systematic observation instruments have become training tools which give information to people being observed. Simon and Boyer (1974) report that fifty-two of the ninety-nine

systems they report on are now being used for training purposes. These systems provide a mirror for the prospective teacher to obtain feedback about his own teaching behavior. This feedback allows the student to attempt to change his own behavior as a result of the feedback. An illustration of this would be interaction analysis. The student would be able to view the extent of interaction in his/her teaching situation. If he/she was dominating the classroom, then the preservice teacher could modify this behavior based on the feedback from the interaction instrument.

A second use of systematic observation instruments in training is that most of the instruments have been constructed along a theoretical dimension which includes behaviors that are thought to promote pupil learning. Many of these behaviors are not usually found in classrooms. This then offers an opportunity for prospective teachers to learn new behaviors and expand their teaching repertoire. Feedback is received on what behavior is not being used as well as on what is being used (Simon and Boyer, 1974).

The implications of using systematic observation to measure teaching competence are many. As has been pointed out, most of these instruments were developed initially for research purposes. They collect data on specific teaching skills. The data is generally not suitable for evaluative purposes. The instruments are appropriate for use in training programs. They can provide formative data on specific skills that hopefully will help students change their own behavior through this type of feedback.

Some illustrations of systematic observation instruments are the Observation Schedule and Record (OScAR 4V) (Medley, Note 1), Flanders System of Interaction Analysis (FSIA) (Flanders, 1966), and the Galloway System (Galloway, 1968).

Rating Scales

Good (1959) defines "rating" as an estimate according to some systematized procedure of the degree to which an individual person or thing possess some characteristic. He defines "rating scales" as a device used in evaluating products, attitudes, or other characteristics of instructors or learners. Rating scales used for observation are different from systematic observation instruments in that they record general impressions as to what has occurred, whereas the systematic observation instruments describe in detail what has happened.

Rating scales are used more extensively than any other device in attempting to measure teaching competence by observation. Often rating scales include items that are not operationally defined, do not allow for proper time sampling, and do not have interrater reliability.

Remmers (1963) suggests five criteria for judging the appropriateness of rating scales as measuring devices.

1. Objectivity. Use of the instrument should yield verifiable, reproducible data not a function of the peculiar characteristics of the rater.

2. Reliability. It should yield the same values, within the limits of allowable error, under the same set of conditions.

3. Sensitivity. It should yield as fine distinctions as are typically made in communicating about the object of investigation.

4. Validity. Its content, in this case the categories in the rating scale, should be relevant to a defined area of investigation and to some relevant construct.

5. Utility. It should yield relevant information and should not be so cumbersome as to preclude collection of data at a reasonable rate.

Figure 1 is an illustration of an all encompassing rating scale to measure teacher competency. It deals with the intellectual ability of the preservice teacher, includes personality characteristics as well as considering teaching skills. The rater is forced to respond on a five point scale. Figure 2 illustrates a rating scale with descriptors of the competency being measured.

The rating scale is probably the most useful to teacher educators who are attempting to do both summative and formative evaluation. It is necessary to state competencies in clear and precise terms so that the items to be measured by the rating scale will have operational definitions that leave little room for disagreement. Standard procedures for establishing validity and reliability should be used in the development of any scales.

Interviews

A technique to obtain information that can be used in measurement is the interview. The interview is really a verbal test where preservice students respond to questions related to

BETHANY COLLEGE, LINDSBORG, KANSAS
Competency Assessment

Name ..... Date .....

School ..... Subject/Grade .....

Cooperating Teacher ..... College Supervisor .....

Consider each of the following items as applying to the student who is seeking certification as a teacher. Mark *only one choice* for each item by circling the appropriate numeral according to the following scale:

5—This competency is *frequently* evident as (s)he functions in the role of teacher.

4—This competency is *sometimes* evident as (s)he functions in the role of teacher.

3—This competency may be possessed by the teacher, but it was not observed.

2—The *lack* of this competency is sometimes evident as (s)he functions in the role of teacher.

1—The *lack* of this competency is *frequently* evident as (s)he functions in the role of teacher.

I. INTELLECTUAL

1. Possesses a breadth and depth of knowledge encompassing those aspects of learning for which certification is sought 5 4 3 2 1
2. Possesses a knowledge of contemporary developments in curriculum materials for the area(s) of certification sought 5 4 3 2 1
3. Demonstrates ability to determine home and community backgrounds of pupils in order to determine (a) reasons for specific pupil behaviors (b) unique needs of learners 5 4 3 2 1
4. Demonstrates the ability to devise and carry out systematic self-evaluation 5 4 3 2 1
5. Possesses a well-developed philosophy of education which he/she can articulate to others 5 4 3 2 1

II. PERSONALITY

1. Exercises self-control under trying conditions (emotional maturity) 5 4 3 2 1
2. Possesses physical stamina 5 4 3 2 1
3. Demonstrates in his/her personal life a sensitivity to community expectations in the interest of improved support for education 5 4 3 2 1
4. Gives evidence of an integrated value system by which life is lived 5 4 3 2 1
5. Demonstrates integrity in his/her dealings with people 5 4 3 2 1
6. Is willing to expend time and energy as needed in fulfilling teaching responsibilities 5 4 3 2 1
7. Is punctual in meeting appointments and keeping schedules 5 4 3 2 1
8. Is able to establish rapport and a professional relationship with parents, pupils, and peers 5 4 3 2 1
9. Earns rather than demands respect 5 4 3 2 1
10. Shows respect for the learner 5 4 3 2 1
11. Demonstrates a sense of humor: the ability to laugh at self 5 4 3 2 1

III. TEACHING SKILLS

1. Maintains an effective balance of freedom and responsibility in the classroom 5 4 3 2 1
2. Is able to develop both long range and short range instructional plans 5 4 3 2 1
3. Is able to use a variety of methods which promote learning 5 4 3 2 1
4. Is able to develop and use realistic and well-articulated instructional objectives 5 4 3 2 1
5. Is able to locate and/or devise appropriate learning materials 5 4 3 2 1
6. Can design and use a variety of techniques in evaluating the attainment of instructional objectives 5 4 3 2 1
7. Provides for systematic feedback about performance on subject-matter assignments 5 4 3 2 1
8. Possesses teaching skills to the extent that he/she is able to carry out teaching responsibilities while maintaining a well-rounded life style 5 4 3 2 1

IV. MAKING KNOWLEDGE MEANINGFUL

1. Is able to identify pupil's level of learning and to prescribe the appropriate learning experiences 5 4 3 2 1
2. Provides opportunity and guidance for pupils to be independent learners 5 4 3 2 1
3. Communicates effectively verbally and non-verbally 5 4 3 2 1
4. Is able to explain, illustrate, and/or clarify tasks to promote efficiency and effectiveness in learning 5 4 3 2 1
5. Is able to operate and use effectively appropriate hardware and software 5 4 3 2 1
6. Is able to organize content as necessary to assist learners 5 4 3 2 1

V. CREATING A DESIRE FOR LEARNING

1. Is enthusiastic about his/her subject 5 4 3 2 1
2. Uses honest and genuine encouragement to increase pupil's self-esteem 5 4 3 2 1
3. Is an inquirer able to excite other learners 5 4 3 2 1
4. Has empathy for learners 5 4 3 2 1
5. Thinks creatively 5 4 3 2 1

VI. CREATING A DESIRABLE LEARNING CLIMATE

1. Is able to analyze teacher behavior and predict pupil behaviors generated by it 5 4 3 2 1
2. Is able to determine causes rather than mere symptoms in improving undesirable pupil behavior 5 4 3 2 1
3. Maintains classroom discipline conducive to learning .. 5 4 3 2 1
4. Utilizes good housekeeping habits in care of classroom and equipment 5 4 3 2 1
5. Organizes and arranges classroom to promote learning 5 4 3 2 1
6. Uses a variety of motivational techniques in stimulating pupil learning activities 5 4 3 2 1

Comments, including your recommendation, or lack of it, and the evidence which supports it:

Figure 1

1.00 AREA OF COMPETENCE: DIAGNOSIS

1.101 STATEMENT OF COMPETENCE: Observes pupils in and out of the instructional setting.

FROM TOWARDS

1	2	3	4	5
Indicators of Competence				
a. Observes pupils in classroom and in other situations. b. Uses devices such as checklists to aid in observation.		a. Reports general observations to the supervising teacher. b. Prepares anecdotal records. c. Prepares written or oral reports of group interaction, individual interaction, and adult-child relationships.		a. Reports specific observations to the supervising teacher.

Other indicators of competence are to be negotiated according to the context in which the student is working.

Figure 2*

* This is adapted from: An Assessment System Utilizing Teacher Competencies for Differentiated Staffing. Developed by Mentor Ohio Exempted Village School District and the Center for Competency Based Education, University of Georgia, 1974.

the competencies they are attempting to demonstrate. A problem with the interview technique is in communication from the interviewer to the respondent and back again. A situation needs to exist where openness and honesty make answers come easily. The place of the interview in measuring competence is in the author's opinion an opportunity to check out other sources of data (e.g., rating scales). One illustration of the interview technique being used to determine competency in beginning teachers is in Dekalb County, Georgia (Note 2). The interview is only part of an evaluation effort with beginning teachers. The interview precedes classroom observations where rating scales are also used to measure teacher competence. Figure 3 illustrates a structured interview instrument.

Interviews cannot serve to evaluate the total competence of a preservice teacher. However, they do provide another source of data that can be part of a measurement effort. It would be necessary to have an interview instrument such as the one displayed in Figure 3 that would provide structure. It would also be necessary to have a procedure for assigning some value to the answers obtained in the interview.

Products

Products, things preservice teachers make such as lesson plans, and anecdotal records, are another source of data that is often overlooked in assessing the competence of teacher education students. The Oregon College of Education's program (Schalock, Kersh, Garrison, 1976) uses ratings on the products of a prospective teacher's behavior as one of five different sources of

PBC/SS Project

TEACHER INTERVIEW/QUESTIONNAIRE

COMPETENCY IV - The teacher develops instructional plans for promoting achievement of the specified objectives.

YES NO

____ ____ 1. Do you use varied materials and equipment in your class?

a. Explain how you organize and use materials and equipment during your class.

2. Do you use materials for:

____ ____ a. remediation

____ ____ b. development

____ ____ c. enrichment

____ ____ 3. Do you use evaluation techniques other than written tests or questions? e.g. oral questions, large or small group discussion.

a. Please describe.

COMPETENCY V - The teacher utilizes resource material.

YES NO

____ ____ 1. Do you have materials for student enrichment or projects?

a. Describe

____ ____ 2. Do you encourage students to use the Learning Resources Center?

a. Explain.

Figure 3*

*Adapted from Teacher Interview/Questionnaire used by the Dekalb County, Georgia Performance Based Certification/Supportive Supervision Project.

data in arriving at judgements about competence. Two of their competency clusters rely on the ratings of products. These competency clusters are: Planning and Preparing for Instruction, and Obtaining and Using Pupil Outcome Information. The products that serve as a basis for judgement for the first competency are instructional plans. The products that are used to determine competence for the latter competency are summaries of pupil outcome data, accompanied by interpretations of those data in terms of contributing factors and implications for the next steps. An illustration of a form to measure a product is found in Figure 4. A five point rating scale is used to evaluate the lesson plan presented in that figure.

Products like interviews cannot give a complete picture of competency. They do, however, provide a very concrete source of data. The lesson plan, for instance, is something tangible, it can be considered in terms of predetermined specifications and a value assigned. Measuring the value of products requires that a structured form be developed. Usually products that are rated unsatisfactory are returned and not accepted until they are satisfactory. Thus, the rating scale of products is probably formative when ratings are unsatisfactory and summative when they are satisfactory.

LESSON PLAN EVALUATION FORM

Student's Name _____ *Lesson Number* _____

Have the evaluators that check your plan initial each of the items listed that meets with their approval. If the treatment of an item is thought to be outstanding, have the evaluator draw a circle around his or her initials. Be sure to attach this sheet to your lesson plan.

ELEMENTS OF THE PLAN	*EVALUATORS OF THE PLAN*		
	School Supervisor	*College Supervisor*	*Content Specialist*
OBJECTIVES			
Are the learning outcomes expected from the lesson clearly stated?			
Are they appropriate and worthwhile outcomes, given the characteristics of the pupils to be taught?			
Are the indicators that are to be used as evidence of successful outcome achievement identified?			
Are the procedures to be used in obtaining evidence of outcome achievement identified?			
ADAPTING OBJECTIVES TO LEARNER CHARACTERISTICS			
Are there provisions for modifying the objectives of the lesson to meet individual pupil characteristics?			
SELECTING INSTRUCTIONAL MATERIALS AND PROCEDURES			
Are the instructional materials to be used in the lesson clearly identified?			
Are they appropriate to the learners to be taught and the learning outcomes to be achieved?			
Are the organizational and instructional procedures to be used in the lesson clearly identified?			
Are they appropriate to the learners to be taught and the learning outcomes to be achieved?			
EVALUATION			
Are there provisions for determining where pupils stand with respect to the desired learning outcomes of the lesson before it is presented?			
Are there provisions for feedback to pupils about their performance during the time the lesson is being presented?			
Are there provisions for determining where pupils stand with respect to the desired learning outcomes of the lesson after it has been presented?			
PLANNING NEXT STEPS			
Is there some indication in the plan of what would be done next with the pupils if the learning outcomes expected from the lesson materialize?			
Is there some indication in the plan of what would be done next with the pupils if the learning outcomes expected from the lesson did not materialize?			
MATCHING INSTRUCTOR, LESSON AND CONTEXT			
Does the lesson as planned appear to be feasible and appropriate to the school setting in which it is to be presented?			
Does the lesson as planned appear to be feasible and appropriate to the student who is to present it?			

Figure 4
Field Test Format 2
Experimental Elementary Teacher Education Program
Oregon College of Education
December 1972

Some Tentative Conclusions

The systematic observation systems that have been developed will continue to offer the best means of looking at teaching by the researcher. Some of these systems offer much to the teacher training program. They do not, however, offer a viable means of measuring the competence of preservice teacher education candidates.

At the present time, it would appear that the most appropriate instruments for measuring the competence of preservice teachers are rating scales which can be utilized to make estimates of the value of performance in the work context; structured interviews which assist in verifying what was observed in the work context; and instruments (a type of rating scale) which measures the products developed prior to or during the work context. These data gathering devices used collectively offer a greater probability of an accurate measure of competence than do either of the three individually.

In the development of the three measures care must be taken to define operationally what is to be measured. In the observation rating scales the categories to be used must be specific and leave little to the imagination of the rater. The specifications for the products to be developed must be precise. If a lesson plan is a product, then the elements of the lesson plan must be spelled out so that there is no question as to its appropriateness. The interview instrument must contain questions that relate directly to the competencies being measured.

The context in which the competency is to be measured must be spelled out. If, for example, the preservice teacher is to be observed teaching an inquiry lesson in the structured work context, then the rating scale should be designed to measure this. The rating scale should not be a general scale that attempts to determine how well a preservice teacher does when teaching a lesson. Closely related to the problem of context is what the instrument is designed to measure. The instruments that are developed should be designed to measure specific competencies, again such as the inquiry lesson rather than a general lesson.

Once instruments are developed, they can be improved only through rigorous field testing. Standard procedures for establishing validity and reliability should be followed. Various time samplings should be undertaken in order to determine what amount of measurement is necessary in order to get an accurate picture of the competence of the preservice teacher. Those that are to be used in the measurement process need to be trained in the use of the instruments. Interrater reliability needs to be established as well as the amount of time required to use the instruments.

The measurement of competence will continue to be an elusive goal. As was pointed out earlier in the paper, we need to begin. Unsophisticated measures can become sophisticated only if teacher educators are willing to begin and to employ procedures that allow for continuous revision and improvement.

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